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Rattania setulifera, an undescribed endophytic hyphomycete on rattans from Western Ghats, India

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Abstract – *Rattania setulifera* gen. et sp. nov., isolated from fresh leaves of rattan (*Calamus thwaitesii*), is described and illustrated. The endophytic hyphomycete is characterized by setose sporodochia, branched conidiophores, monoblastic, sometimes sympodial conidiogenous cells and slimy, fusiform, aseptate to multiseptate, curved conidia bearing tiny setulae at both ends.

Key words – biodiversity, anamorphic fungi, taxonomy, tropical forests

Introduction

During studies on the diversity of microfungi associated with plants of the Western Ghats, an undescribed dematiaceous hyphomycete was isolated from fresh leaves of rattan. This fungus is distinguished by a unique combination of features that warrant its accommodation in a new genus, described here.

Materials and methods

Freshly collected leaf laminae of *Calamus thwaitesii* Becc. (*Arecaceae*) were surface sterilized in 70% ethanol (1 min), 4% sodium hypochloride (3 min) and 70 % ethanol (30 s) and thoroughly rinsed in sterile distilled water. Each leaf lamina was cut into 5 mm square pieces and plated on malt extract agar (MEA, HiMedia) plates (9 cm diam., Borosil glass) with antibiotics incorporated (composition in 1 L: 5 g malt extract, 20 g agar, 20 mg each of bacitracin, neomycin, penicillin, streptomycin and tetracycline). The plates were incubated at 25°C with diurnal light for 15 days. The fungus appeared on the surface of cut leaf pieces as sporodochia. A pure culture of the fungus was obtained by transferring spores from the sporodochium into fresh MEA plates.

Taxonomic description

Rattania Prabhugaonkar & Bhat, **gen. nov.**

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Ad fungos conidiales, hyphomycetes. Sporodochia atro brunnea, setosus. Setae rectae vel flexuousae, non ramosae, atro brunneae. Conidiophora distinctus, ramosa, laevia, hyalina, formans densus fasciculus. Cellulae conidiogenae integratae vel discretae plerumque monoblasticae, aliquando extensus sympodialiter semel vel bis ad producens successivus solitaria holoblastica conidia, cicatrices conidiales inconspicuae, planus. Conidia mucosus, solitaria, fusiformis, curvatus, hyalina, laevia, 0–multiseptatus, basi anguste truncata, acuminatus ad apicem, utrinque una setula praedita.

Species Typica: *Rattania setulifera* Prabhugaonkar & Bhat

Etym.: *Rattania* — Host of type species is a rattan

Conidial fungus, hyphomycetes. Sporodochia superficial, gregarious, dark brown, setose, with a small stroma at the base. Setae erect, straight to flexuous, unbranched, rhizoidal at base, tapering to a pointed apex, septate, smooth, thick-walled, dark brown. Conidiophores distinct, branched, smooth, hyaline, arising in a palisade layer from a pseudoparechymatous stroma. Conidiogenous cells terminal, integrated or discrete, usually monoblastic, sometimes extending sympodially once or twice to produce successive solitary holoblastic conidia, after secession leaving an inconspicuous, flat secession scar with no evident wall thickening. Conidia slimy, solitary, fusiform, curved, hyaline, smooth, 0–multiseptate, thin-walled, truncate at the base, acuminate at the tip, setulate at both ends.

With sporodochial conidiomata, holoblastic conidiogenous cells and setulate conidia, genera such as *Fumagopsis* Speg., *Hyphodiscosia* Lodha & K.R.C. Reddy, *Mycocentrospora* Deighton and *Megalodochium* Deighton show some affinity with *Rattania* (Ellis 1971, 1976, Carmichael et al. 1980) (Table 1, p. 222). The genus *Fumagopsis,* typified by *F. triglifioides* Speg., has setose sporodochia and holoblastic, discrete conidiogenous cells but differs from *Rattania* by producing catenate, non-setulate conidia (Spegazzini 1910). In *Hyphodiscosia,* typified by *H. jaipurensis* Lodha & K.R.C. Reddy, conidiophores are mononematous and conidia are holoblastic and setulate. In *Mycocentrospora,* typified by *M. acerina* (R. Hartig) Deighton, conidiophores develop in fascicles without setae and conidia bear a 1-septate appendage at the base. In *Megalodochium,* typified by *M. palmicola* Deighton, conidiomata are sporodochial, without setae, conidiogenous cells integrated, terminal or discrete and conidia are aseptate, dark brown, densely spinulose and without setulae (Ellis 1976). None of these have the combination of characters that define *Rattania*, namely setose sporodochia, monoblastic, sometimes sympodial, integrated as well as discrete conidiogenous cells and 0–multiseptate, slimy, hyaline, fusiform conidia with setulae at both ends.

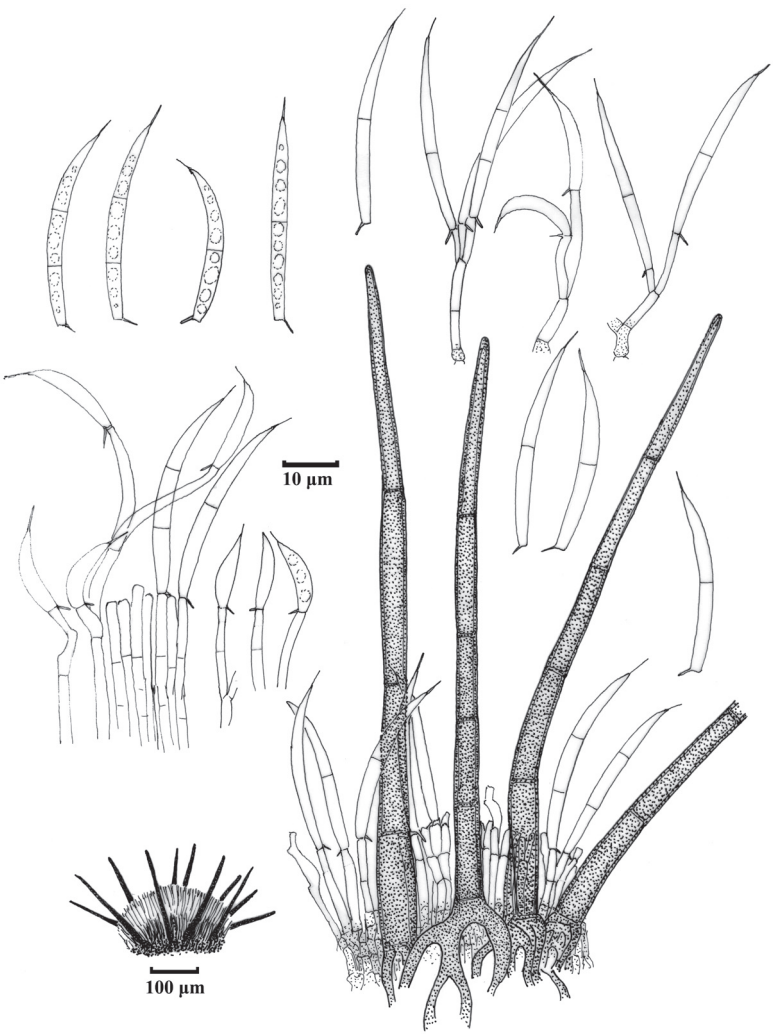

Fig. 1: *Rattania setulifera.* Sporodochium, setae, conidiogenous cells and conidia.

The hyphomycete genus *Minimidochium* B. Sutton has much similarity with *Rattania* in having a stromatic base, setose sporodochia and fusiform, setulate conidia; it differs by having phialidic conidiogenous cells with a distinct collarette and aseptate conidia with rounded ends (Ellis 1976).

Coelomycetes genera such as *Chaetopatella* I. Hino & Katum. (Nag Raj 1974), *Shanoria* Subram. & K. Ramakr. (Morgan-Jones et al. 1972a) and *Heteropatella* Fuckel (Morgan-Jones et al. 1972b) have similar setulate conidia but possess pycnidial fruiting bodies.

Rattania setulifera Prabhugaonkar & Bhat, **sp. nov.** Figs 1–2

MycoBank MB 512877

Coloniae in substrato effuse; in MEA-cultura effusae, planus, margine fimbriatus, granularis, pallide aurantiacus 3 cm diametro in 10 dies. Sporodochia atro brunnea, setosus, 160–490 × 100–450 µm. Setae non ramosae, ad apicem acutus, saepe e rhizoideis conspicuis, 2–6 septis, atrobrunneae, 85–370 µm longa, 4–13 µm lat. ad basim, 3–10 µm lat. in medius, crassitunicatae, usque ad 1 µm lat. Conidiophora ramosa, hyalina, formans densus fasciculus, usque ad 30 µm longa. Cellulae conidiogenae terminales, integratae vel discretae plerumque monoblasticae, aliquando extensus sympodialiter semel vel bis ad producens successivus solitaria holoblastica conidia, uterque extensus circa 4–8 um longa, cicatrices conidiales inconspicuae, planus, non-incrassatae 3–13 × 1.5–2.5 µm. Conidia mucosus, fusiformis, deorsum truncata, acuminatus ad apicem, 0–5 (plerumque 1–2) septis, utrinque una setula praedita, 25–50 µm longa, 1.5–3.5 µm lat. ad basim. Setula basalis, excentrica, 1–3 µm longa. Setula apicalis extensus e conidia acutatus apicem, 2–5 µm longa.

Holotype: On fresh leaves of *Calamus thwaitesii*, A. Prabhugaonkar, 21/08/2008, Dhoodhsagar, Goa, India. Herb. No. HCIO 48776; ex type culture No. GUFCC 15501.

Etym.: *setulifera* – having setulate spores

Colonies on the substratum effuse; on MEA slow growing, effuse, flat, with fringed margin, granular, pale orange, up to 3 cm diam. in 10 days. Sporodochia superficial, gregarious, scattered on leaf pieces placed on MEA, dark brown, setose, with dark brown stromatic base, 160–490 × 100–450 µm. Setae unbranched, erect, straight to flexuous, rhizoidal at the base, tapering towards apex into an acute tip, smooth, 2–6-septate, unbranched, thick-walled, walls up to 1 µm wide, dark brown, 85–370 µm long, 4–13 µm wide at base, 3–10 µm wide in middle. Conidiophores arising from the stroma, branched, hyaline, forming dense clusters, up to 30 µm tall. Conidiogenous cells terminal, integrated or discrete, usually monoblastic, sometimes extending sympodially once or twice to produce successive solitary holoblastic conidia, each extension about 4–8 um long, after secession leaving an inconspicuous, flat secession scar with no evident wall thickening, 3–13 × 1.5–2.5 µm. Conidia slimy, solitary, fusiform, truncate at the base, acuminate at the tip, hyaline, smooth, thin-walled, 0–5 (mostly 1–2) septate, 25–50 µm long, 1.5–3.5 µm wide at base and middle; setulate at both ends, setula at the base attached to one side, 1–3 µm long, at the apex 2–5 µm long.

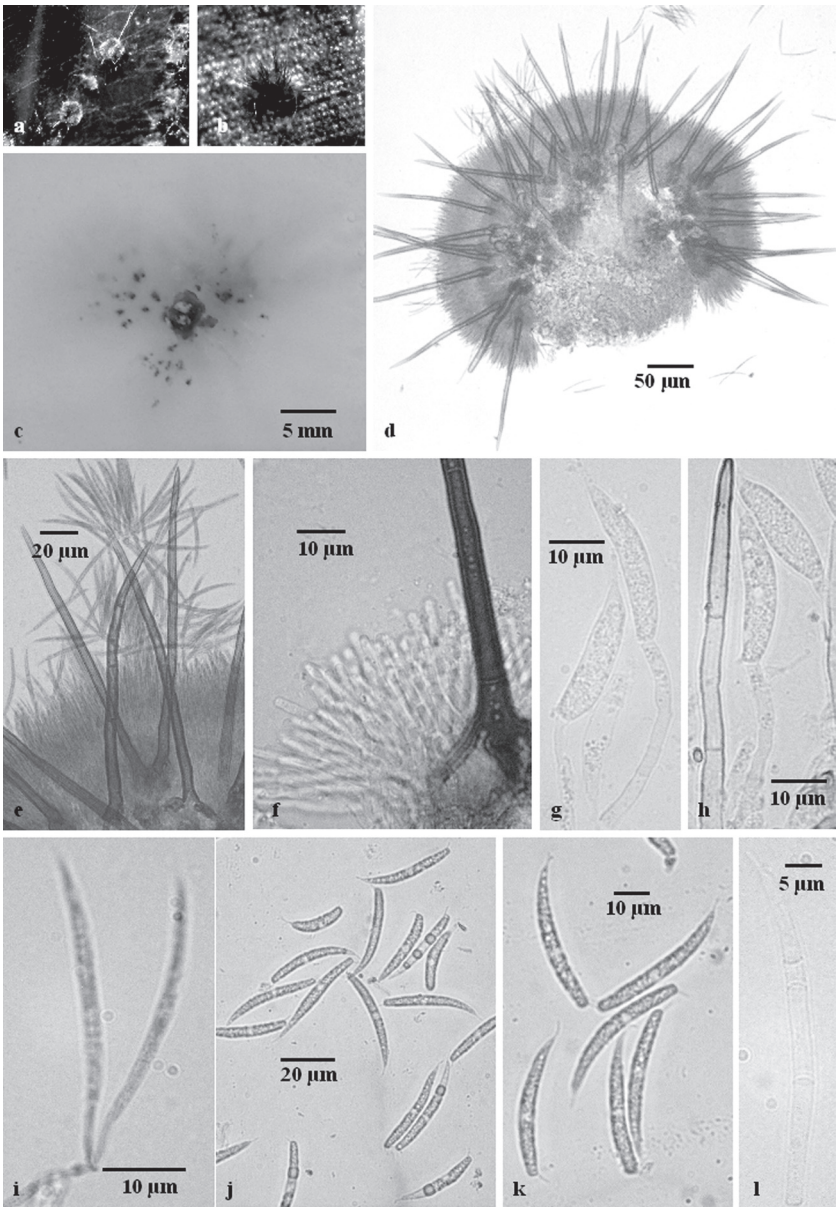

Fig. 2: *Rattania setulifera.* a–b. Sporodochia on host tissue;
c. Colony on agar plate; d. Sporodochium; e–f. Setae, conidiogenous cells and conidia;
g–i. Sympodial conidiogenous cells with attached conidia; j–l. Conidia with setulae.

Table 1: Comparison of *Fumagopsis*, *Hyphodiscosia, Megalodochium, Mycocentrospora* and *Rattania*.

Genus	Conidiomata	Conidiogenous cells	Conidia & Setulae
Fumagopsis	Sporodochia, with setae	Discrete, determinate, subcylindrcal, holoblastic	Catenate, triradiate, with truncate base and obtuse apex, without setulae
Hyphodiscosia	Mononematous, without setae	Integrated, polyblastic	Rounded at apex, truncate at base with setulae at each end
Mycocentrospora	Mononematous, fasciculate, without setae	Integrated terminal, polyblastic	Hyaline with broader cells pale brown, obclavate with truncate base and with 1-septate lateral appendage at basal end
Megalodochium	Sporodochia, without setae	Holoblastic, mostly integrated and terminal but sometimes discrete	Ellipsoidal, somewhat flattened, 0-septate, dark brown, densely spinulose, without setulae
Rattania	Sporodochia, with setae	Integrated, terminal or discrete, monoblastic, sometimes sympodial	Hyaline, fusoid, acuminate apex, truncate base, 0–3 septate, with setula at each end

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